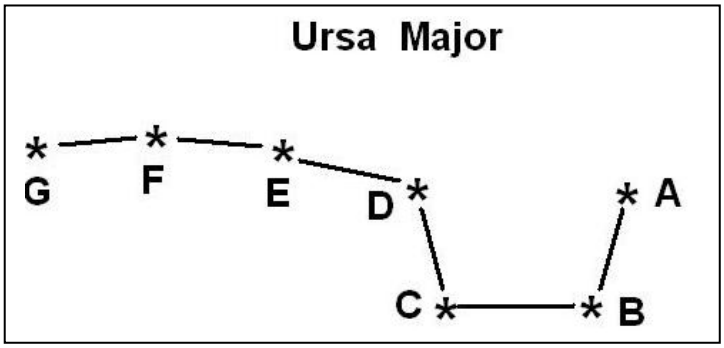
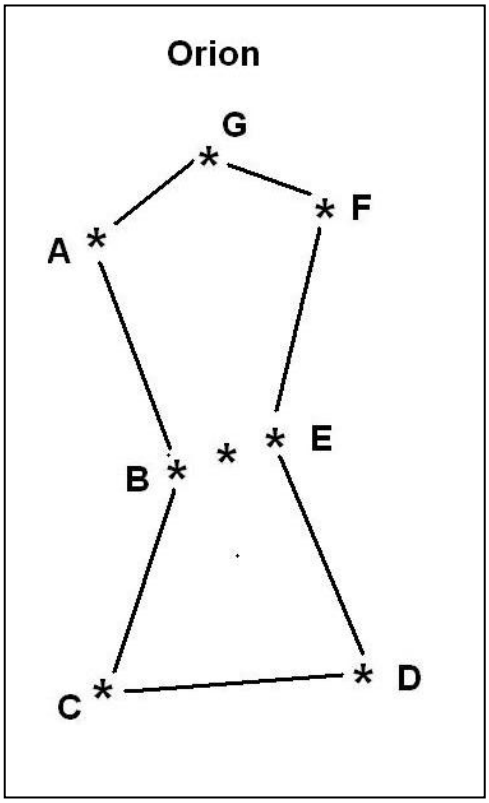
Perimeters: Which constellation is the longest?

Star Segment	Length
AB	5 1/2
BC	8
CD	4 1/2
DE	5 1/3
EF	4 1/3
FG	6 2/3





Star Segment	Length
AB	10
BC	7
CD	8 1/4
DE	8
EF	6
FG	4 1/4
GA	5 1/2

Constellations are patterns of stars in the sky that have been recognized for thousands of years.

Constellations form various kinds of irregular geometric figures, but we can study them by examining some of their basic properties. One of these is their perimeter.

Here are two well-known constellations, Ursa Major, also known as the Big Dipper in English-speaking countries, and Orion 'The Hunter'. On star charts they look like they are about the same size, but let's put this to a test. Lets measure the separations between the stars in degrees and calculate their perimeters.

Problem 1 - From the corresponding table above, calculate the total perimeter of Ursa Major by adding up the lengths of the star segments from AB to FG which are given in degrees.

Problem 2 - From the corresponding table to the left, calculate the total perimeter of Orion by adding up the lengths of the star segments from AB to GA which are given in degrees.

Problem 3 - Which constellation has the longest perimeter in degrees?

Problem 4 - What is the average distance in degrees between the stars along the perimeter of A) Ursa Major? B) Orion?

Problem 5 - In which constellation are the stars the farthest apart on average?

Problem 6 - Can you name another property of a constellation that could be interesting to study?

Answer Key

Problem 1 - From the corresponding table above, calculate the total perimeter of Ursa Major by adding up the lengths of the star segments from AB to FG which are given in degrees.

Answer: 5 1/2 + 8 + 4 1/2 + 5 1/3 + 4 1/3 + 6 2/3 = 34 1/3

Problem 2 - From the corresponding table to the left, calculate the total perimeter of Orion by adding up the lengths of the star segments from AB to GA which are given in degrees.

Answer: 10 + 7 + 8 1/4 + 8 + 6 + 4 1/4 + 5 1/2 = 49

Problem 3 - Which constellation has the longest perimeter in degrees?

Answer: Orion.

Problem 4 - What is the average distance in degrees between the stars along the perimeter of Ursa Major?

Answer: A) For Ursa Major, there are 6 segments so we have to divide the perimeter by 6 to find the average distance. 34 1/3 degrees / 6 = 34 1/3 x 1/6 = 103/3 x 1/6 = 103/18 = 5 13/18 degrees

B) For Orion, there are 7 segments in Orion so the average length of a segment is 49 degrees/7 = 7 degrees

Problem 5 - In which constellation are the stars the farthest apart on average?
Answer: Orion

Problem 6 - Can you name another property of a constellation that could be interesting to study?

Answer: Students may identify, for example, the total area of a constellation, the length of the largest star segment spanning the constellation (Such as AG in Ursa Major or GC in Orion), the number of obtuse angles.